What is claimed is:

1. A semiconductor device comprising:

a semiconductor substrate of a first conductivity type;

a channel region formed at a surface of the semiconductor substrate;

source and drain regions of a second conductivity type formed at both sides of the channel region in the semiconductor substrate;

an insulating layer covering the channel region; and

a gate electrode formed on the insulating layer,

the insulating layer containing impurity atoms in such a manner that a concentration thereof is non-uniformly distributed along a surface parallel to the semiconductor substrate.

2. The semiconductor device according to claim 1, wherein the impurity atoms are selected from the group consisting of B, C, N, F, P, S, Cl, As, Se, and Br.

3. The semiconductor device according to claim 1, wherein a highest concentration of the impurity atoms is equal to or a lowest concentration thereof or twice as large as the lowest concentration thereof.

4. The semiconductor device according to claim 1, wherein a highest concentration of the impurity atom is equal to or more than 10^{19} cm^{-3}.

5. A method of manufacturing a semiconductor device comprising:

forming an insulating layer on a semiconductor substrate of a first conductivity type;

forming a conductive layer on the insulating layer;

forming on the conductive layer a spotted layer including minute spots containing a resistive material resisting against ion implantation;

non-uniformly implanting impurity ions to the conductive layer via the spotted layer containing the resistive material;

and

diffusing the impurity ions in the conductive layer into the insulating layer.

6. The method of manufacturing a semiconductor device according to claim 5, wherein the impurity ions are selected from the group consisting of B, C, N, F, P, S, Cl, As, Se and Br.

7. The method of manufacturing a semiconductor device according to claim 5, wherein the resistive material is a resist.

8. The method of manufacturing a semiconductor device according to claim 6, wherein the spotted layer is formed by applying the resist to the conductive layer, and spottedly leaving the resist on the conductive layer by performing etch back of the resist.

9. The method of manufacturing a semiconductor device according to claim 5, further comprising:

forming a gate oxide layer from the insulating layer; and

forming a gate electrode from the conductive layer.

10. A method of manufacturing a semiconductor substrate comprising:

forming an insulating layer on a semiconductor substrate of a first conductivity type;

forming a conductive layer on the insulating layer;

performing implantation of impurity ions several times so that an impurity concentration of the conductive layer becomes non-uniform due to implantation fluctuations; and

diffusing the impurity ions in the conductive layer into the insulating layer.

11. A method of manufacturing a semiconductor substrate comprising:

forming an insulating layer on a semiconductor substrate

of a first conductivity type;

forming a conductive layer on the insulating layer;

forming minute concavity and convexity on a surface of the conductive layer by etching the conductive layer;

performing ion implantation of impurity ions on the conductive layer having the concavity and convexity on the surface; and

diffusing the impurity ions in the conductive layer into the insulating layer.

12. The method of manufacturing a semiconductor substrate according to claim 11, wherein the etching is chemical dry etching.

13. The method of manufacturing a semiconductor substrate according to claim 11, wherein the etching is wet etching.

14. The method of manufacturing a semiconductor device according to claim 12, wherein said impurity ions are selected from the group consisting of B, C, N, F, P, S, Cl, As, Se and Br.

15. The method of manufacturing a semiconductor device according to claim 13, wherein said impurity ions are selected from the group consisting of B, C, N, F, P, S, Cl, As, Se and Br.

16. The method of manufacturing a semiconductor device according to claim 14, further comprising:

forming a gate oxide layer from the insulating layer; and

forming a gate electrode from the conductive layer.

17. The method of manufacturing a semiconductor device according to claim 15, further comprising:

forming a gate oxide layer from the insulating layer; and

forming a gate electrode from the conductive layer.